

REMARKS

The Office Action has rejected Claim 67 under 35 U.S.C. § 102(b) as defining subject matter which is allegedly anticipated by the teachings in U.S. Patent No. 5,830,326 to Iijima (“Iijima”).

Applicants have added claims and are submitting herewith a Declaration executed by Alexander Moravsky (“Moravsky Declaration”), which when considered with the comments hereinbelow, are deemed to place the present case in condition for allowance. Favorable action is respectfully requested.

Before addressing the merits it is noted that there is an error on the first page of the Office Action. The Office Action lists that the highest numbered claim pending is 100. However, the present application additionally contains claims 101-110, which have been withdrawn. Correction of the record is respectfully requested.

At the outset, applicants have added Claims 111-114. Support for the added claims is found throughout the specification. For example, claim 111 is supported by the disclosure on Page 14, lines 17-20 of the instant specification and Page 19, lines 6-17 of the instant specification. Claim 112 is supported by Example 4 of the instant specification, while Claim 113 is supported by the disclosure on Page 14, lines 17-22 of the instant specification. Finally, Claim 114 is supported by the subject matter on Page 14, lines 23-28.

No new matter is added to the application.

Pursuant to the rejection of Claim 67, the Office Action cites Iijima.

The present application is directed to, inter alia, a solid substance comprised by more than one half by weight of hollow carbon nanotubes having walls consisting essentially of two layers of carbon atoms, said nanotubes consisting of two concentric nearly cylindrical graphene

layers.

Iijima is directed to a graphite filament having carbon as a basic structural unit, which has a tubular shape being formed with a helical structure with the carbon hexagons as a main structure and with an outer diameter of 30nm or less. As described in column 2, line 27 to column 3, line 4 of Iijima, the tubular structure is comprised of a multiple structure with each individual tubule having a helical structure. As further described in column 3, line 28-43 of Iijima, the graphite filaments described therein are comprised of concentric nested tubules arranged to form a few atomic layers of graphite sheets, making up tubular lattices a_1 , a_2 , a_3 as shown in Figure 2. Although Iijima admits that it is possible to obtain a multiple structure with two, five or seven tubules, it is apparent from Iijima that the majority of the product formed does not have two layers. Otherwise, he would not make the comments that the structure obtained from his process is the structure depicted in Figure 2, which, structure has more than three layers. Nor would he make a statement that it is possible to obtain a structure with, e.g., two tubules if DWNTS were the dominant product. In fact, as indicated in the previous responses, DWNTS, if produced at all, constitute much less than 1% of the total amount of multi-wall nanotubes produced in Iijima. One of the differences between the claimed subject matter and the teachings of Iijima is that the DWNTS in the claimed subject matter is a dominant product being present in more than 50% by weight, while any DWNTS found in the Iijima process constitutes less than 0.1% of the total product by weight.

The 0.1 wt. % content of DWNTS in the Iijima product is a reliable assessment of the upper limit of the DWNTS content formed in the graphite filaments produced by his process. This assessment was previously based on the analysis of the amount of appropriately low diameter carbon nanotubes that have been produced in a similar arc system to the one described

in Iijima and under similar process conditions described in Iijima. See Kiselev et al, Carbon, 37, 1093-1103 (1999), a copy of which was made of record. Thus, the assessment revealed an amount of DWNTS which is at least two orders of magnitude below that recited in the claim.

To further substantiate that the amount of DWNTS produced in accordance with the procedure described in Iijima is significantly less than the amount recited in Claim 67, attention is directed to the Moravsky Declaration. As Moravsky testifies, he repeats the process of Iijima to determine whether any DWNTS are produced and if so, the amount of DWNTS so produced (See paragraph 9 of Moravsky Declaration). As described therein, Moravsky repeated the process described in Iijima at two different pressures, 100 Torr and 10 Torr (See paragraph 11 in Moravsky Declaration). As Dr. Moravsky testifies, the amount of DWNTS produced under the two different pressures amounted to less than one DWNT per 100 multiple wall nanotubes produced (See paragraph 16 of Moravsky Declaration). It was further determined that the amount of DWNTS produced in accordance with the procedure described by Iijima was less than 0.1 wt % (See paragraph 17 of Moravsky Declaration). In conclusion, as testified by Dr. Moravsky, the DWNT content in the nanotube product produced in accordance with the procedure described in Iijima is much less than 0.1 wt %, while the content by number is much less than one DWNT produced per 100 MWNTS (See paragraph 18 of Moravsky Declaration). In other words, the amount of DWNTS produced by the process described by Iijima is much less than the 50% by weight, as recited in Claim 67.

Applicants respectfully submit that the present invention is not anticipated by the teachings of Iijima. Case law has held that anticipation requires that the prior art reference must teach and disclose each and every element of the claim, either implicitly or explicitly. MGH2/Biophile Int'l Corp. v. Milgraum, 192 F3d. 1362, 1365, 52 USPQ2d, 1303, 1305 (Fed.

Cir. 1999). The absence in the prior art of any element in the claim negates anticipation Kalman v. Kimberly Clark Corp., 713 F2d 760, 771-772, 218 USPQ 781, 789 (Fed. Cir. 1988).

It is respectfully submitted that there are differences between the present invention and the graphite filaments discussed in Iijima. As described hereinabove, the majority of the products formed in Iijima are multi-walled and not two layers, as claimed. There is no teaching of any separation of any of the products. Thus, the product in Iijima contains mostly a multi-wall layered structure, and is predominately a solid having a multi-wall structure. There is no product depicted or described in Iijima in which a two-layered structure is the predominant product or is separated from the multi-wall structures produced by the process of Iijima.. A product having a multi-wall structure is not the same as a product having a two-layered structure, as claimed. Further, the amount of DWNTs formed under the process conditions in Iijima is less than 0.1 wt%. Moreover, the process of Iijima produces less than one DWNT per 100 MWNTS. This amount of DWNT's produced by Iijima is significantly less than the minimum of 50% by weight recited in Claim 67. Consequently, Iijima does not teach or disclose a solid comprised of more than half by weight of hollow carbon nanotubes, having walls consisting essentially of two layers of carbon atoms, said nanotubes consisting of two concentric nearly cylindrical graphene layers, as recited in Claim 67. Thus, Iijima does not anticipate the present invention, as claimed.

Accordingly, the rejection of Claim 67 under 35 U.S.C. § 102(b) is obviated; withdrawal thereof is respectfully requested.

Thus in view of the Remarks herein and the Declaration of Dr. Moravsky, it is respectfully submitted that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Mark J. Cohen". The signature is fluid and cursive, with the first and last names being more prominent.

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